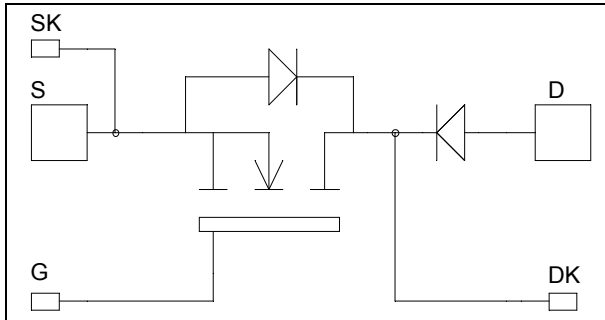


Single switch with Series diode MOSFET Power Module

$$V_{DSS} = 1000V$$

$$R_{DSon} = 45m\Omega \text{ typ @ } T_j = 25^{\circ}C$$

$$I_D = 215A \text{ @ } T_c = 25^{\circ}C$$



Application

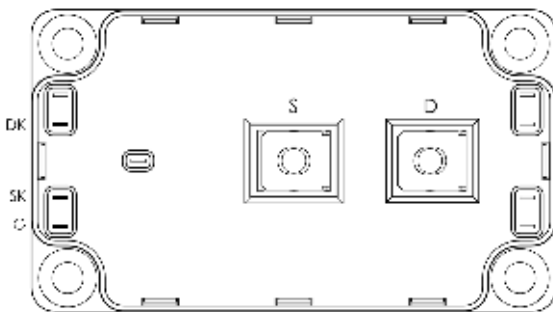
- Zero Current Switching resonant mode

Features

- Power MOS 7[®] MOSFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- High level of integration
- AlN substrate for improved thermal performance

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS Compliant



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	1000	V
I_D	Continuous Drain Current	$T_c = 25^{\circ}C$	A
		$T_c = 80^{\circ}C$	
I_{DM}	Pulsed Drain current	860	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	52	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^{\circ}C$	W
I_{AR}	Avalanche current (repetitive and non repetitive)	30	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	3200	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 1000V$ $T_j = 25^\circ\text{C}$			600	μA
		$V_{GS} = 0V, V_{DS} = 800V$ $T_j = 125^\circ\text{C}$			3	mA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 107.5A$		45	52	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 30\text{mA}$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 600	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		42.7		nF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		7.6		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.3		
Q_g	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 500V$ $I_D = 215A$		1602		nC
Q_{gs}	Gate – Source Charge			204		
Q_{gd}	Gate – Drain Charge			1038		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 670V$ $I_D = 215A$ $R_G = 0.5\Omega$		18		ns
T_r	Rise Time			14		
$T_{d(off)}$	Turn-off Delay Time			140		
T_f	Fall Time			55		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 215A, R_G = 0.5\Omega$		7.2		mJ
E_{off}	Turn-off Switching Energy			4.3		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 215A, R_G = 0.5\Omega$		12		mJ
E_{off}	Turn-off Switching Energy			5.8		

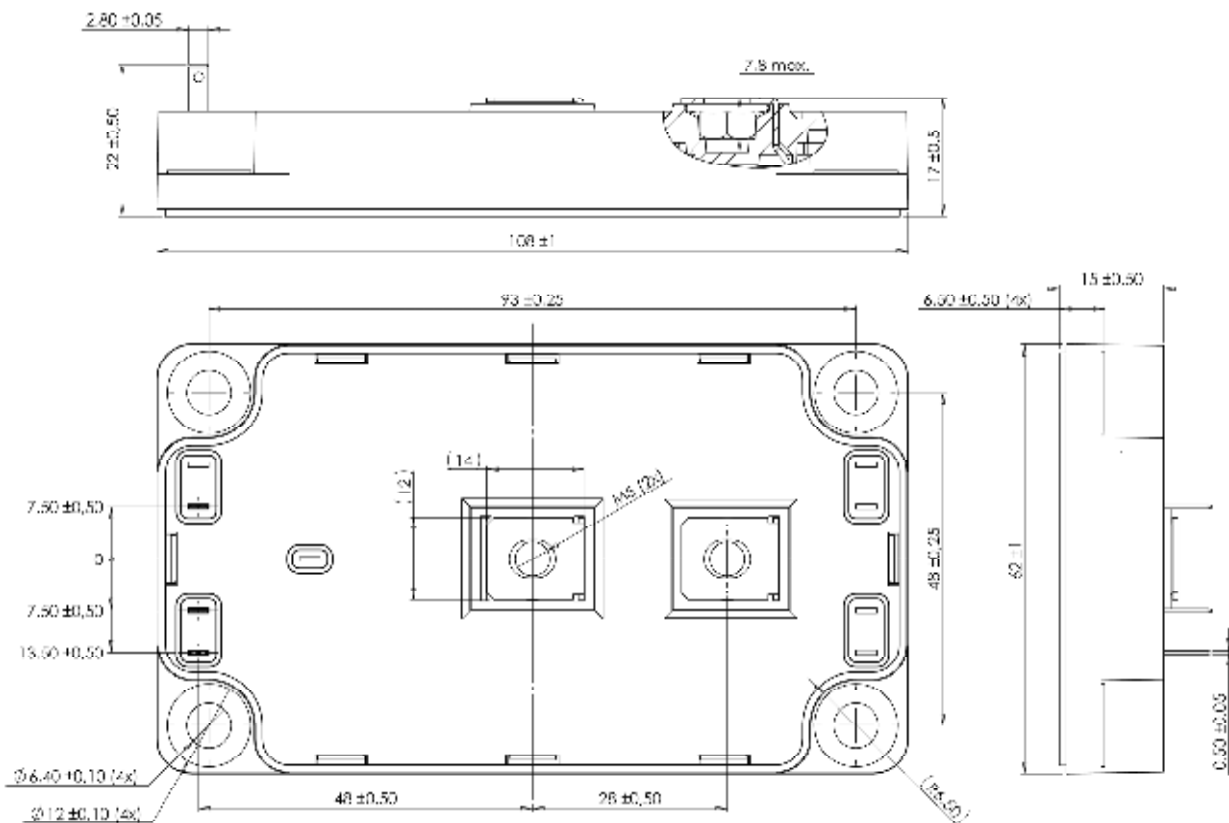
Series diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Repetitive Reverse Voltage		1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ\text{C}$		600	μA
			$T_j = 125^\circ\text{C}$		2000	
I_F	DC Forward Current	$T_j = 80^\circ\text{C}$		360		A
V_F	Diode Forward Voltage	$I_F = 360A$		2.5	3	V
		$I_F = 720A$		3		
		$I_F = 360A$ $T_j = 125^\circ\text{C}$		1.8		
t_{rr}	Reverse Recovery Time	$I_F = 360A$ $V_R = 800V$ $di/dt = 1200A/\mu\text{s}$	$T_j = 25^\circ\text{C}$		265	ns
			$T_j = 125^\circ\text{C}$		350	
Q_{rr}	Reverse Recovery Charge	$di/dt = 1200A/\mu\text{s}$	$T_j = 25^\circ\text{C}$		3.3	μC
			$T_j = 125^\circ\text{C}$		17.3	

Thermal and package characteristics

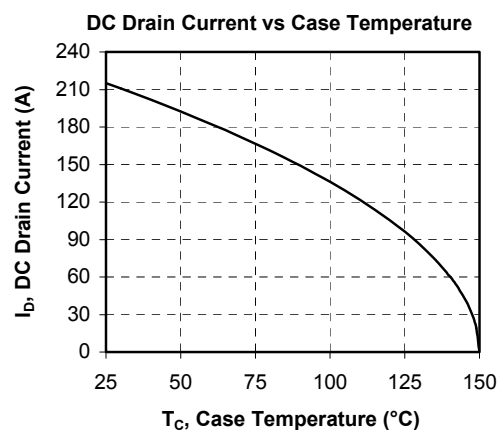
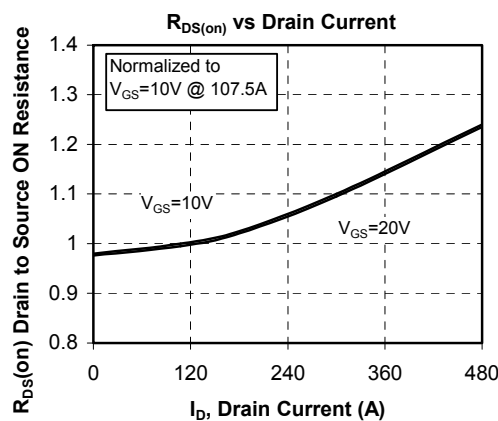
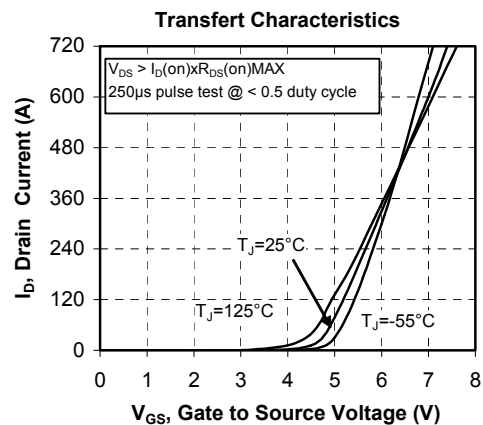
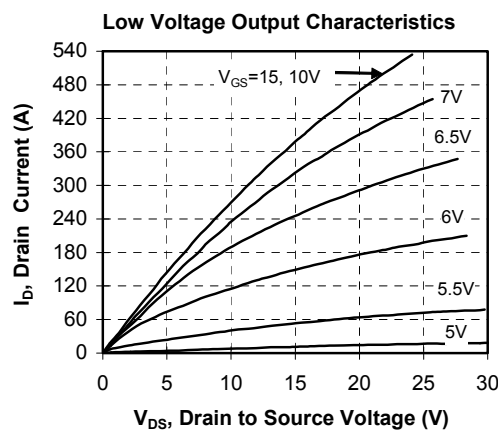
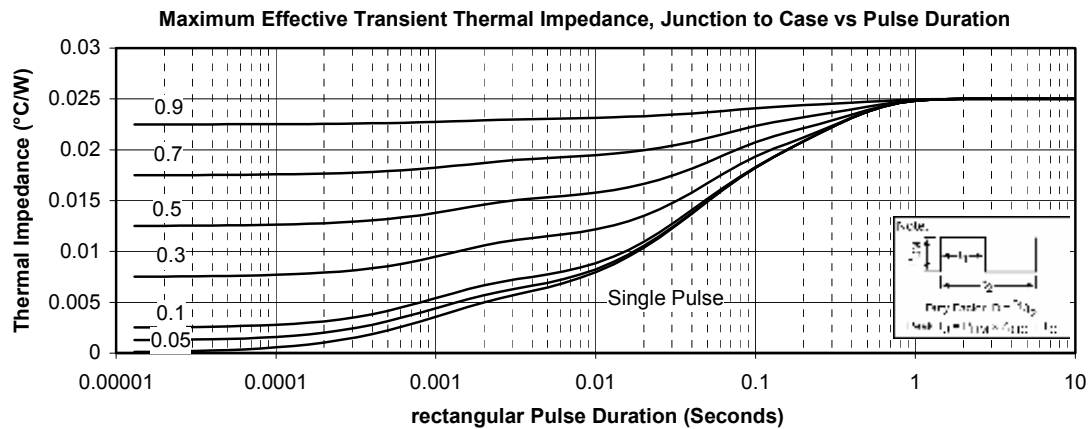
Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	Transistor			0.025	°C/W
		Series diode			0.16	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz		4000			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	Storage Temperature Range		-40		125	
T _C	Operating Case Temperature		-40		100	
Torque	Mounting torque	To Heatsink	M6	3	5	N.m
		For terminals	M5	2	3.5	
Wt	Package Weight				300	g

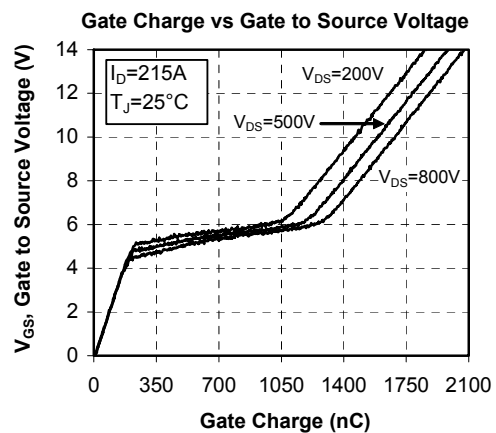
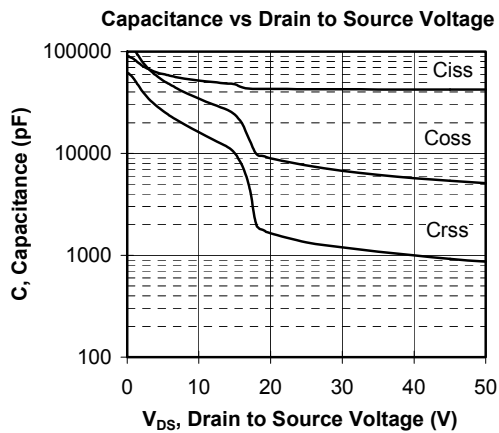
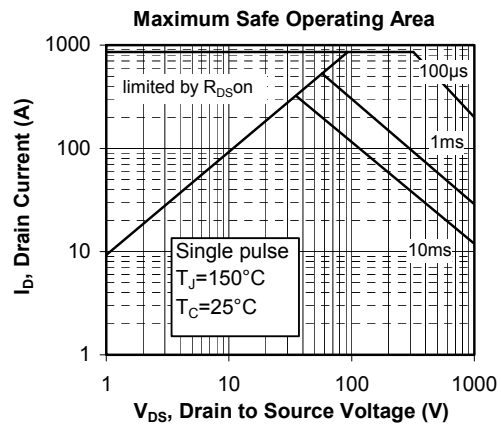
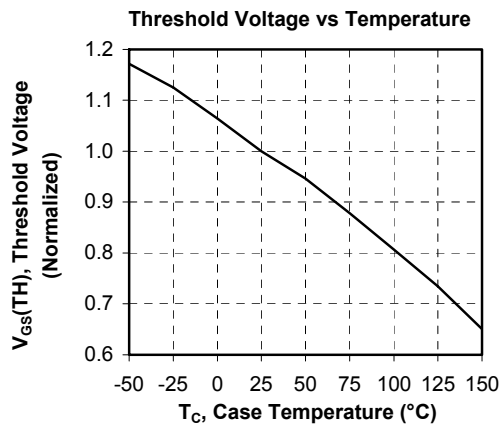
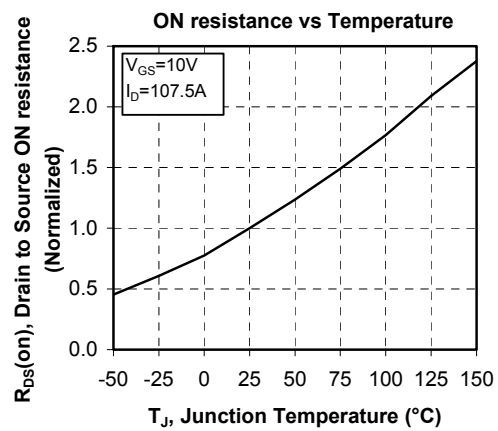
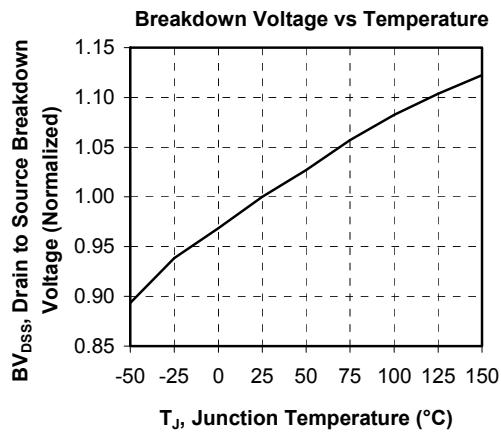
SP6 Package outline (dimensions in mm)

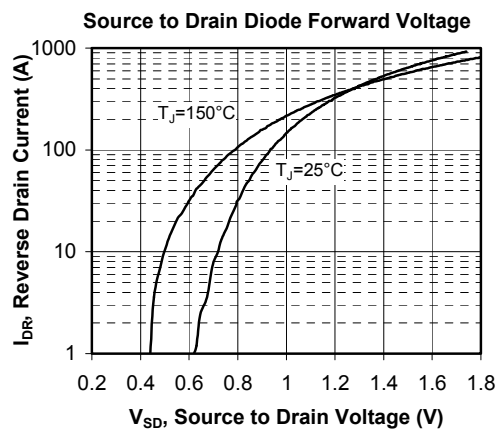
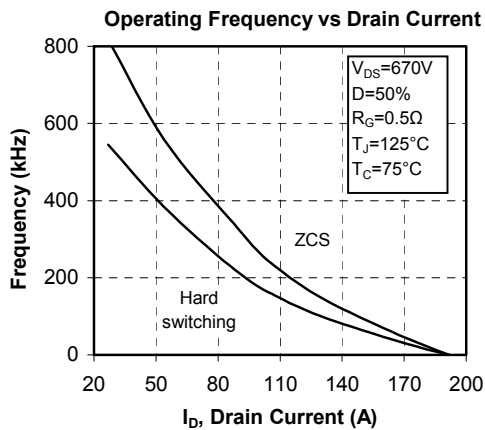
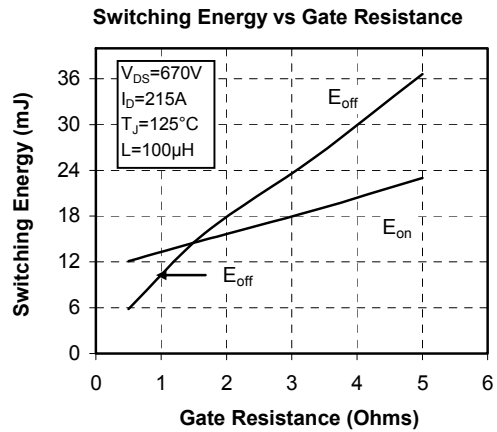
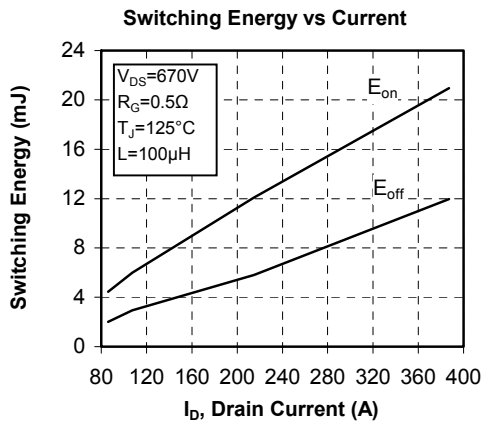
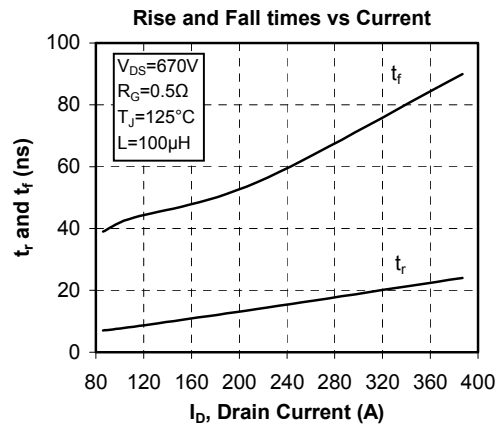
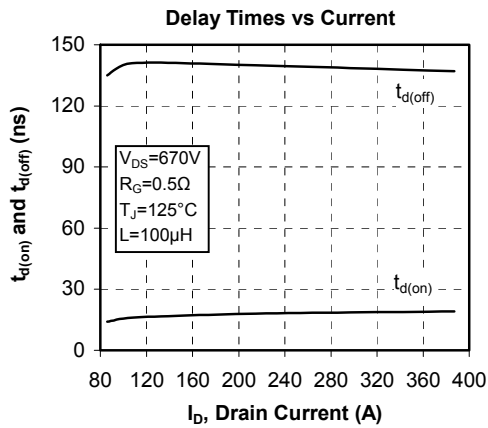


See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve







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